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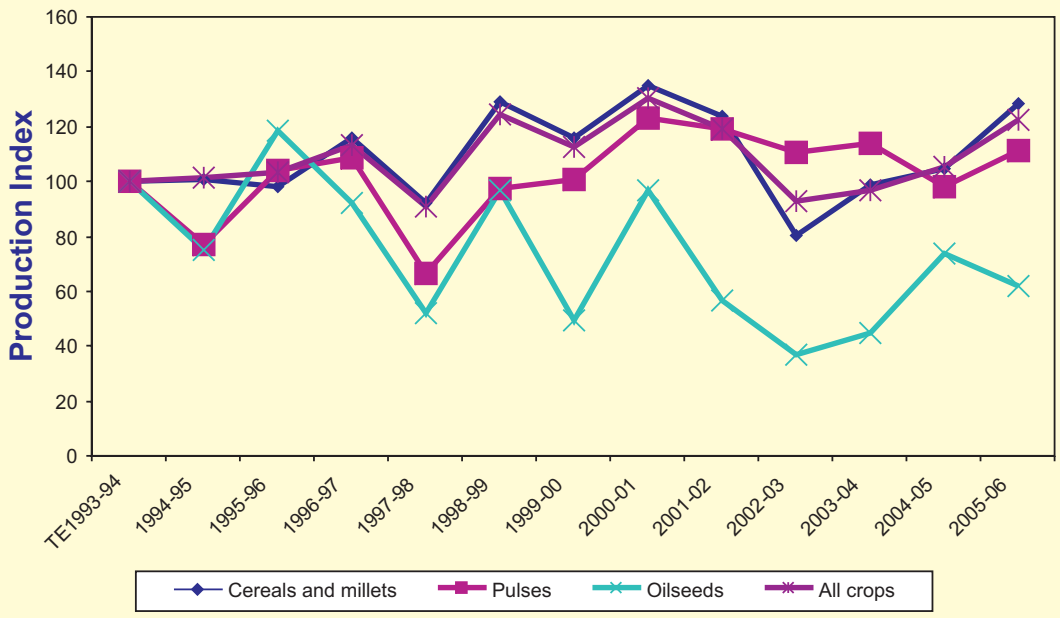
Performance of Agriculture in Andhra Pradesh – A spatial and temporal analysis

Policy Paper



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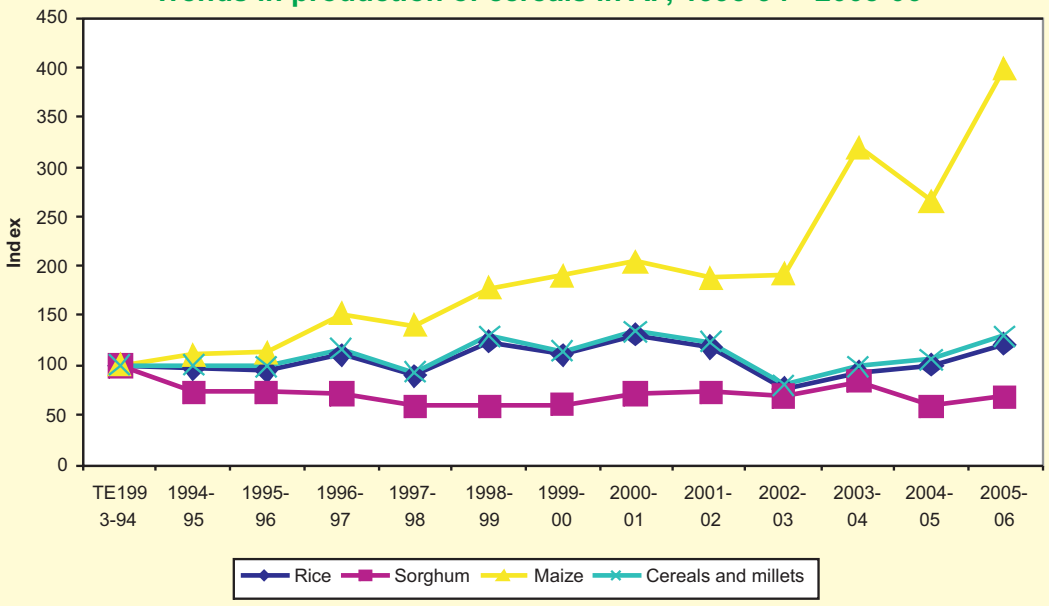
Trends in production of cereals in AP, 1993-94 - 2005-06



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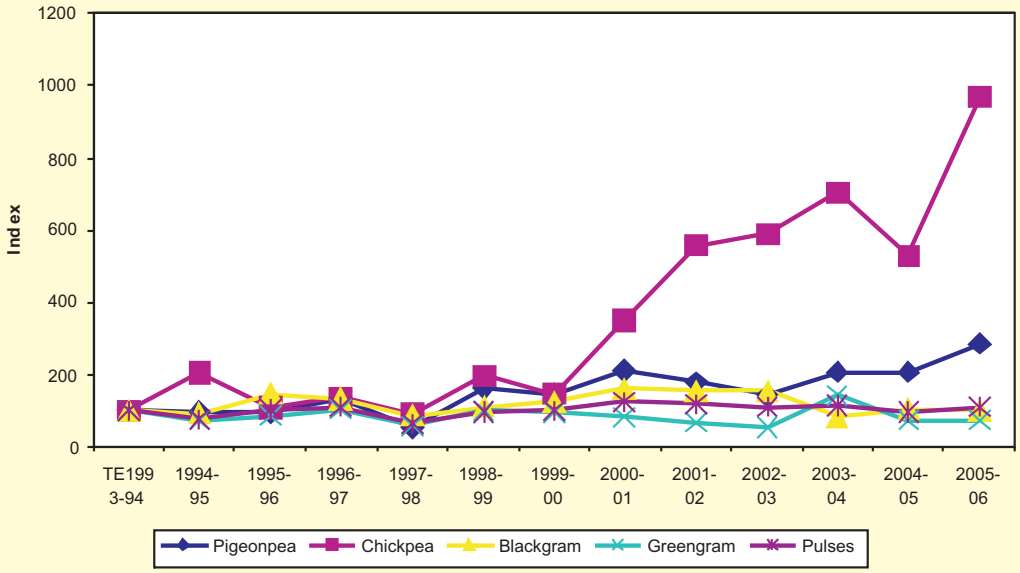

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Performance of Agriculture in Andhra Pradesh – A spatial and temporal analysis

1.0 INTRODUCTION

India's agricultural performance over the years can be said to be quite remarkable, as food grain production increased by more than four times after Independence and had been ahead of population growth rate. During the decades after Green Revolution, not only has the dependence on imports of farm products, especially food grains, declined, but also the exports have been increasing. India's capabilities for management of droughts and famines have also been creditable. The growth in agriculture has also contributed to the reduction in incidence of rural poverty (Parthasarathy, 1994). This growth in agriculture, which was more conspicuous after the introduction of Green Revolution technology, has over time spread to the relatively less endowed rainfed regions and farmers.

India's impressive growth during and after Green Revolution propelled overall growth rate during the 1970's and 1980's. Subsequently, the industry and services sectors played a key role in taking the Indian economy to almost a double-digit growth rate. However, agriculture could not maintain or take off in maintaining higher growth rate due to many reasons. The decreasing contribution of agriculture to GDP is a cause of concern because of its impact on the millions of livelihoods. International comparisons reveal a wide gulf in India's performance between achievements in output and productivity. While India compares favourably in terms of total output, it compares poorly in terms of yield per hectare.

The present situation in agriculture rightly deserves a renewed attention because of two reasons. First, at micro level farmers continue to be vulnerable to monsoon failures and their incomes badly affected. At the macro level, the fast changing international agricultural trade competition requires agriculture to be more efficient. Within India, the slow / stagnant growth in agriculture is considered to be a drag on the overall economic growth. The agriculture sector presently is expected to grow at 4% in order to achieve the nine per cent growth rate that is targeted for the economy.

Among the various states of the country, Andhra Pradesh is an agriculturally important state in India. It is the third largest producer of rice and groundnuts while it is second in cotton and sunflower. It has been one of the front-runners in reaping the benefits of green revolution. However, its vast dryland tracts could not keep pace with the better-endowed regions resulting in wide inter-regional disparities. In order to address the problems of agriculture, the State has been implementing various schemes from time to time. Despite this, agriculture in the state has been exhibiting stagnation in growth and is seeking innovative policy and technology interventions.

Andhra Pradesh is also an important producer of horticulture crops. The National Horticulture Mission (NHM) has identified the state as having potential to enhance

exports of mango, banana, grapes, papaya, guava, brinjal and cabbage. Diversification has been identified as one of the potential ways of enhancing growth and ensuring stability in agriculture. Therefore an attempt is made in this document to critically analyse the performance of agriculture over time at aggregate and district level so as to arrive at appropriate policy measures towards bootings agricultural production, productivity and profitability.

This document is organized as follows:

The approach adopted for the study and the scope in terms of time span and geographical coverage are described in the next section. Then, the aggregate picture of the state with respect to growth in different field crops is presented. This is followed by a presentation of findings form the district level growth analysis of crop sector. The next two sections are concerned with sate and district level analysis of horticultural sector. An overview of growth in the key infrastructural variables is described in the penultimate section. The final section presents the summary and policy implications that emerged from the study.

2.0. METHODOLOGY

The analysis is based on the secondary data collected from various sources such as the Center for Monitoring Indian Economy, publications and official web sites of government of Andhra Pradesh (www.aphorticulture.com, www.aponline.com).

The period of analysis ranged from 1980-05 for arable crops and 1998-05 for horticultural crops. In order to capture the changes in growth behaviour over time, analysis was also done for the 1980s, 1990s and the period after 2000. These sub-periods largely represent the pre-liberalization, liberalization and status since globalization of Indian economy.

The analysis is confined to those districts, which cumulatively accounted for 80 per cent of the area under the crop concerned, during the Triennium Ending 2005 (TE2005), as it would help better target the interventions, in terms of research, extension and other development initiatives. Since, growth in infrastructure is critical to agricultural growth, how different components of infrastructure changed in the recent past was also examined and presented. The growth rates were computed by fitting a semi-log time trend equation to the variable concerned.

3.0. ANDHRA PRADESH AGRICULTURE AT A GLANCE

Andhra Pradesh is ranked eighth among the states both in terms of share of agriculture GDP (24.7 %) and employment generation (58.55%)as per the 61st round of National Sample Survey (Dev, 2007). Of the total geographical area of 27 million ha in the state, 39 per cent is net sown area with a cropping intensity of 124 per cent. The net irrigated area of the state is 4.4 million ha, while the area under rainfed agriculture is 6.4 million ha. The state receives an average rainfall of 940 mm. Out of the state's 11.5 million landholdings, 61 per cent are marginal and another 22 per cent are small.

During 2005-06 Andhra Pradesh accounted for 12.24 per cent of the country's rice production and stands third among the rice producing states. The state's share in groundnut production is to the tune of 17.32 per cent and is next only to Gujarat and Tamil Nadu. In the production of sunflower and cotton, Andhra Pradesh stands second with shares of 30 and 18.5 per cent, respectively in the country's production (MoA, 2007). The state ranks highest in the country in the production of mango, chillies and turmeric. It is also ranked first in productivity of coarse cereals like sorghum, maize and also in chickpea.

Compared to the pre-emptive position of the state in terms of contributions to the nation's granary and in respect of production from other agricultural crops, the growth rates of the economy are less impressive and are in fact less than the country's average rates (Table-1). However, there are problems in the basic elements (agricultural growth, poverty reduction, health and education, and regional disparities) of inclusive growth. Growth of agriculture, particularly crop sector, has been very low. Also employment growth in the post reform period (1993-94 to 2004-05) is the lowest in the country. The recent data shows that literacy levels are also low as compared to many other states. The National Family Health survey (NFHS III) ranked Andhra Pradesh at 11 out of 17 states in the year 2005-06 (Dev, 2007). The capital expenditure in agriculture as percentage of net state domestic product in Andhra Pradesh was comparatively higher (3.5-6.3%) during the past three Five-Year Plans. On the contrary, the amount of NSDP from agriculture per hectare was moderate at Rs.37,383/- in Andhra Pradesh compared to Rs.70,524/- in West Bengal during the triennium ending 2004-05.

Table 1: Growth in agriculture versus non-agriculture in Andhra Pradesh and India (%)

		1980-81 to 1989-90	1990-91 to 1999-00	2000-01 to 04-05
Andhra Pradesh	GSDP	4.9	5.2	6.9
	Agriculture	2.1	2.1	0.9
	Non-agriculture	6.6	6.4	7.4
	Per capita GSDP	2.8	3.9	4.8
India	GDP	5.2	6.0	6.1
	Agriculture	3.1	2.8	1.9
	Non-agriculture	6.3	7.2	7.2
	Per capita GDP	3.1	4.1	4.5

Source: Department of Economics and Statistics, 2007.

3.1 CROP SECTOR

3.1.1. State Level Analysis

The growth rates achieved in area, production and productivity of major crops for the period 1980-2005 are presented in Tables 2 to 4. The area under rice was stagnant, except for decline during the period 2001-05. While the area under millets (sorghum, maize, pearl millet and finger millet) declined all through the period of study with the exception of maize, which had a significant positive growth especially during 1990s and 2001-05. This was in tune with the national trend as reported by Bhalla and Singh (2001) and Kubo (2006). Among the pulses, chickpea showed a significant gain in area, while in oilseeds sunflower area grew significantly in the 1980s and during 2001-05 (Table-2). Groundnut, an important oilseed crop gained area during the 1980s, due to the fillip provided by the Technology Mission on Oilseeds but lost area in the 1990s and 2001-05. This was probably due to cheaper import of edible oils, as the government eased restriction on imports.

Table 2: Estimated compound growth rates (%) in area sown to major crops in Andhra Pradesh during 1980-2005

Crop	1980-05	1981-90	1991-00	2001-05
Rice	-0.26	0.53	0.55	-8.50
Sorghum	-5.90	-5.46	-5.26	-5.76
Pearlmillet	-7.37	-8.30	-7.14	-4.25
Maize	2.59	-1.37	4.08	8.90
Finger millet	-5.30	-5.49	-5.67	-7.47
Pigeonpea	3.11	4.85	2.28	0.81
Chickpea	8.95	0.66	10.10	15.59
Black gram	3.84	10.26	-1.89	-8.45
Green gram	-0.38	-2.28	-1.31	0.87
Groundnuts	0.72	5.81	-3.33	-1.50
Sunflower*	14.40	38.94	3.77	28.83
Castor	-0.34	2.17	-4.70	-6.92
Cotton	4.26	4.26	6.33	0.04
Sugar cane	2.46	1.30	-1.07	4.84
Chillies	1.64	4.03	0.83	0.94

*The area under sunflower was negligible before 1983.

The growth rates of yields were negative in respect of blackgram, chickpea, groundnut and sunflower, during 1991-05. Among the commercial crops, the gain in growth rate was the highest in chillies (Table 3). There was a slowdown in yield growth during the period after 1990 in case of rice. Sorghum productivity increased at a rate of 3.94% during 2001-05 reversing the trend in the earlier decade.

Table 3: Estimated compound growth rates (%) in the productivity of major crops in Andhra Pradesh during 1980-2005

Crop	1980-05	1981-90	1991-00	2001-05
Rice	1.82	1.97	1.14	1.27
Sorghum	2.08	0.18	-0.46	3.94
Pearlmillet	1.73	-0.83	2.23	-0.51
Maize	3.52	-1.39	5.44	2.12
Finger millet	0.90	0.87	-0.11	1.11
Pigeonpea	2.93	-0.59	3.05	0.60
Chickpea	5.09	3.50	-0.09	-3.99
Black gram	0.04	7.96	-1.00	-5.67
Green gram	0.52	-1.56	2.28	3.34
Groundnuts	-0.39	2.05	-2.30	-5.07
Sunflower*	2.82	6.74	-3.32	-9.72
Castor	3.06	4.61	-2.27	7.72
Cotton	1.19	-2.85	-2.36	5.66
Sugar cane	0.06	-3.13	4.23	-8.83
Chillies	3.89	6.30	4.97	9.52

*The area under sunflower was negligible before 1983

The production of rice, which is the staple crop in the state, grew at a rate of 2.5 per cent per annum during the 1980s against the long-term growth rate of 1.56 per cent (Table-4). This growth in production was driven by the growth in productivity (1.97%). During the 1990s, the production fell to 1.69 per cent and the productivity to 1.14 per cent. These growth rates are in line with those reported by Kubo (2006). However, during 2001-05, the production trends in rice are more discouraging. The production of rice in the state outgrew the population growth, which was about 2.17 for the 1980s, and 1.30 per cent for the 1990s. The rate of decline in production of sorghum, pearl millet and finger millet was highest during the 1990s. This was predominantly due to fall in the area sown to these crops. Rapidly changing food habits in favour of fine cereals like rice and wheat (Kumar et. al, 2007) and non-inclusion of coarse cereals in the PDS are quoted as major reasons for this drastic trend.

Among the millets, the production of maize was encouraging during the1990s, when increased at an annual rate of more than 9 per cent. The growth in production was driven by both area expansion and yield increases. Growing demand for maize as poultry feed and for other industrial uses resulted in a favourable price situation for the crop. Adoption of HYVs, use of fertilizers and pesticides by the farmers resulted in the growth (5.44 % for 1990s). It may, however, be noted that production of maize had declined at an annual rate of 2.74 per cent during 1980s.

There was acceleration in production of pigeonpea and chickpea during the 1990s compared to the 1980s. The production growth in chickpea was more a result of area expansion rather than yield growth. The productivity of pigeonpea increased at an annual rate of 3.05 per cent during the 1990s compared to a decline of 0.59 per cent during the 1980s. The production of black gram was found to decrease at a rate of 2.87 per cent during 1990s and the rate of decline steepened since 2001. On the other hand, the rate of growth in production of green gram was positive during the recent period. The trends in yields were largely responsible for the production trends.

Coming to the production of oilseeds, the situation was not very encouraging. There was a fall in the growth rates in groundnut, sunflower and castor. The production of groundnut decreased at an annual rate of 5.56 per cent during 1990s compared to a growth rate of 7.97 per cent during the 1980s. Similarly, the production of sunflower, which came in a big way during the 1980s, failed to maintain its growth momentum during 1990s. In fact there was no significant growth in production of sunflower during the 1990s. Similar was the situation in production of castor; an important oilseed crop produced in the rainfed regions of the state. The production of cotton increased throughout and this growth was driven by the area expansion rather than yield gain. Yields of cotton showed decreasing trends during both 1980s and 1990s. The production increase observed in the case of chillies was largely a result of yield increase.

Table 4: Estimated compound growth rates (%) in production of major crops in Andhra Pradesh during 1980-2005

Crop	1980-05	1981-90	1991-00	2001-05
Rice	1.56	2.51	1.69	-7.34
Sorghum	-3.94	-5.29	-5.69	-2.05
Pearlmillet	-5.77	-9.06	-5.08	-4.72
Maize	6.20	-2.74	9.75	11.20
Finger millet	-4.45	-4.67	-5.77	-6.44
Pigeonpea	6.14	4.24	5.39	1.45
Chickpea	14.49	4.17	10.00	10.97
Black gram	3.88	19.04	-2.87	-13.66
Green gram	0.14	-3.81	0.93	4.27
Groundnuts	0.33	7.97	-5.56	-6.48
Sunflower	17.62	48.32	0.32	16.31
Castor	2.70	6.88	-6.88	0.26
Cotton	5.50	1.28	3.82	5.74
Sugar cane	2.52	-1.87	3.11	-4.41
Chillies	5.60	10.58	5.83	10.55

3.2. District Level Analysis

The output of the analysis indicating crop wise distribution of cultivated area and the growth rates in area, productivity and production across the major growing districts are presented below.

3.2.1. Major Growing Districts

Cereals and Millets

The concentration of rice, which almost accounts for 25 per cent of the state's gross cropped area, is in the coastal districts followed by a few districts in the Telangana region. Thus twelve out of the 23 districts in the state account for almost 80 per cent of the coverage under rice (Table-5). Maize, a crop mainly feeding to the poultry sector is mostly grown in Telangana region. Same is the case with sorghum with some presence in Kurnool district. The area under pearlmillet, mostly a contingency crop, is scattered. Finger millet is confined to its traditional districts like Vizianagaram, Visakhapatnam, Chittoor, Anantapur and Mahabubnagar.

Table-5: Major cereal and millet crops of Andhra Pradesh with predominant areas (TE 2004-05)

Crop	Total area in A.P. (000ha)	Predominant Districts	Area share (%)
Rice	2961	West Godavari, East Godavari, Krishna, Guntur, Nellore, Srikakulam, Karimnagar, Nalgonda, Warangal, Khammam, Vizianagaram, Mahbubnagar	80
Maize	624	Karimnagar, Medak, Warangal, Mahbubnagar, Nizamabad, Adilabad, Guntur, Khammam	80
Sorghum	591	Mahbubnagar, Kurnool, Adilabad, Medak, Rangareddy, Nalgonda	81
Pearlmillet	106	Prakasam, Nalgonda, Visakhapatnam, Kurnool, Mahbubnagar, Guntur, Kadapa	79
Finger millet	73	Visakhapatnam, Chittoor, Vizianagaram, Mahbubnagar, Anantapur	84

Pulses and Oilseeds

Chickpea is gaining inroads into rabi rice areas and is mainly seen in Rayalaseema, Prakasam and Medak (Table-6). Depleting water availability during rabi is one of the reasons for such shift from rice to other crops. Blackgram, as a catch/relay

crop in between kharif–rabi rice crops is popular in coastal districts. Whereas, greengram is distributed in both Coastal and Telangana regions, about 83 per cent of pigeonpea area is confined to ten districts of the state. The oilseed crops are concentrated in the rainfed districts of Rayalaseema and Mahabubnagar, which account for over 80 per cent of the state's area under such crops (Table-7).

Table-6: Major pulse crops of Andhra Pradesh and their distribution (TE 2004-05)

Crop	Total area in A.P. (000ha)	Predominant Districts	Area share (%)
Chickpea	384	Kurnool, Prakasam, Anantapur, Kadapa, Medak	86
Blackgram	520	Krishna, Guntur, East Godavari, Srikakulam, Prakasam, Medak, Nellore	79
Greengram	536	Medak, Nalgonda, East Godavari, Mahbubnagar, Khammam, Guntur, Prakasam, Krishna, Srikakulam, Warangal, Karimnagar	82
Pigeonpea	478	Prakasam, Mahbubnagar, Adilabad, Anantapur, Guntur, Rangareddy, Nalgonda, Kurnool, Khammam, Warangal	83

Table- 7: Major oilseeds crops of Andhra Pradesh with their concentration (TE 2004-05)

Crop	Total area in A.P. (000ha)	Predominant Districts	Area share (%)
Groundnut	1601	Anantapur, Kurnool, Chittoor, Kadapa, Mahbubnagar	85
Sunflower	475	Kurnool, Kadapa, Anantapur, Mahbubnagar	82
Castor	265	Mahbubnagar, Nalgonda, Prakasam	83

Commercial Crops

Cotton, the major commercial crop of Andhra Pradesh is confined to Telangana, Guntur, Krishna and Kurnool districts (Table-8). Chilies is concentrated in nine districts of the state, while five districts account for over 80 per cent of the sugarcane area of the state.

Table-8: Major commercial crops of Andhra Pradesh with their cultivation concentration areas (TE 2004-05)			
Crop	Total area in A.P. (000ha)	Predominant Districts	Area share (%)
Cotton	939	Adilabad, Guntur, Warangal, Khammam, Nalgonda, Kurnool, Mahbubnagar, Krishna	78
Chillies	234	Guntur, Warangal, Khammam, Prakasam, Kurnool, Krishna, Karimnagar, MahbubnagarNalgonda	80
Sugarcane	250	Visakhapatnam, West Godavari, Chittoor, Medak, Krishna, Nizamabad, East GodavariVizianagaram, Srikakulam	81

3.2.2. Growth Behaviour

Cereals and Millets

The growth rate of rice was negative though not significant in the state and in most of the major growing districts (Table-9). The crop lost area rapidly in Karimnagar, Krishna, Warangal and Mahabubnagar districts during 2001-05, probably due to expansion of area under maize and unfavourable weather during 2001-02 and 2002-03. Yield was declining in six districts and minor yield gains were seen in Srikakulam, Vizianagaram and Godavari districts. Production was also declining during this period in all the districts except in East Godavari and Vizianagaram districts. The area sown to rice, was either declining or stagnating in majority of the districts. There was also a slow down in yield growth, which was reflected in a production decline, especially during 2001-05. This has serious implications to food security at the state level and to the PDS, as the expected levels of supply will be critically affected.

A significant part of area sown to rice is under groundwater irrigation. Two major reasons for shrinkage of area under rice are slow down or decline in the net irrigated area and occurrence of frequent droughts. Except in the case of area under tube wells, the growth in irrigation was negative and significant. There was a negative trend in the net irrigated area in all the districts. The trend was significant in Anantapur, Chittoor, Nizamabad, Medak, Mahabubnagar, Karimnagar and Rangareddy. The latter affects the rice acreage, especially during the rabi season, as the monsoon failures will have a bearing on the availability of groundwater.

Table-9: Compound Annual Growth Rate (CAGR) of rice in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	-0.3	0.7	0.6	-8.5	1.8	2.3	1.1	1.3	1.6	2.9	1.7	-7.3
West Godavari	-0.2	2.1	1.1	-2.4	1.8	-1.0	2.3	3.8	1.7	1.2	3.4	1.3
East Godavari	0.1	2.0	1.0	-1.1	2.1	0.8	2.6	5.3	2.2	2.8	3.6	4.1
Krishna	-1.1	1.4	0.6	-11.9	2.0	3.4	2.2	-2.5	0.9	4.9	2.8	-14.1
Guntur	-0.8	-0.4	0.6	9.4	1.8	4.2	0.5	-1.8	0.9	3.7	1.1	-10.2
Nellore	-0.2	0.3	-0.4	-3.1	2.4	3.4	2.1	1.0	2.1	3.7	1.8	-2.1
Srikakulam	-0.1	-3.4	-1.5	-1.0	1.4	2.6	-2.0	4.2	1.3	-0.9	-3.4	3.2
Karimnagar	0.6	3.4	1.4	-23.0	1.6	1.8	2.6	-6.0	2.2	5.3	4.1	-27.6
Nalgonda	-0.4	0.9	0.0	-11.3	1.1	3.3	-0.6	-0.3	0.7	4.2	-0.6	-11.6
Warngal	1.0	4.4	0.9	-10.9	2.3	1.8	0.7	-0.6	3.3	6.3	1.6	-11.4
Khammam	2.0	6.7	0.8	-2.2	2.5	4.1	0.9	1.6	4.5	11.1	1.8	-0.7
Vizianagaram	0.0	-2.5	0.4	-0.4	1.9	4.8	-1.2	7.8	1.9	2.2	-0.9	7.4
Mahabubnagar	-0.3	-4.3	1.3	-15.6	1.7	0.5	-0.8	-2.9	1.4	-3.9	0.5	-18.1

Maize was gaining importance as a major cereal crop especially since 1991 with faster gains during 2001-05 (Table-10). Guntur district saw a dramatic area expansion. Production growth was faster in Guntur, Mahabubnagar, Warangal and Khammam districts. Yield growth was higher in a resource poor district like Mahabubnagar (33%) followed by Guntur especially during 2001-05. In Karimnagar, which is the largest maize grower, the production was stagnating as the yields were declining. The growth of sorghum in terms of area and production is declining across all the districts except in Kurnool and Nalgonda, which showed positive growth during 2001-05 (Table-11). Poor profitability is one of the reasons for the decline (Dayakar Rao and Parwez, 2005).

Table 10: Compound Annual Growth Rate (CAGR) of maize in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	2.6	-0.7	4.1	8.9	3.5	0.1	5.4	2.1	6.2	-0.6	9.8	11.2
Karimnagar	1.2	-1.2	2.5	8.5	2.7	2.7	4.6	-6.9	3.9	1.5	7.1	1.0
Medak	1.7	0.8	2.1	4.4	4.2	-2.2	5.5	-1.5	6.0	-1.4	7.8	2.8
Warangal	1.8	-6.9	6.9	10.7	4.0	-1.6	4.8	8.1	5.9	-8.3	12.0	19.7
Mahabubnagar	31.7	17.5	50.3	-5.8	1.7	2.6	4.2	32.6	34.1	21.2	56.6	25.0

Nizamabad	-1.0	0.6	-1.5	-1.8	3.2	-0.6	5.5	-4.1	2.2	0.0	4.0	-5.8
Adilabad	1.3	-0.3	3.4	-2.0	5.9	-3.6	10.4	-1.9	7.3	-3.8	14.1	-3.9
Guntur	11.0	9.3	7.4	48.0	4.4	-4.2	8.2	15.9	15.8	4.7	16.2	71.6
Khammam	7.9	2.7	9.4	7.3	4.6	4.5	5.1	2.6	12.8	7.3	15.0	10.1

Table-11: Compound Annual Growth Rate (CAGR) of sorghum in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	-5.9	-5.4	-5.3	-5.8	2.1	-0.4	-0.5	3.9	-3.9	-5.8	-5.7	-2.1
Mahabubnagar	-34.0	-1.5	-5.7	-14.1	1.4	-0.3	-0.7	-7.7	-2.7	-1.8	-6.3	-20.7
Kurnool	-4.1	-4.9	-4.0	4.1	2.4	1.6	-1.3	11.4	-1.7	-3.4	-5.3	16.0
Adilabad	-3.7	-1.0	-3.4	-6.2	3.1	-2.2	1.4	-7.7	-0.7	-3.2	-2.1	-13.4
Medak	-3.4	-2.6	-2.4	-9.0	1.5	-2.7	-2.2	0.2	-1.9	-5.2	-4.6	-8.8
Rangareddy	-3.3	-1.3	-3.5	-11.5	1.5	1.4	-2.9	8.3	1.9	0.1	-6.3	-4.2
Nalgonda	-8.8	-5.2	-8.7	7.4	0.9	0.4	-0.4	-2.7	8.7	-4.8	-9.1	4.4

Similarly, pearl millet is also losing area in all the major districts, which is also reflected in declining production levels (Table-12). The yield levels were found to increase during 1980-05. However, the yield levels fell in Prakasam and Nalgonda, the top two growing regions, during 2001-05. Finger millet is also losing importance as it is not commercially important and its importance in food basket has also gone down (Table-13). This shows that the apparent urban demand for crops like finger millet due to its supposed health benefits has had little impact on either area under the crop or productivity. However, there was some yield growth in Mahabubnagar and Vizianagaram during 2001-05.

Table-12: Compound Annual Growth Rate (CAGR) of pearl millet in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	-7.4	-7.0	-7.1	-4.3	1.7	-0.8	2.2	-0.5	-5.8	-7.7	-5.1	-4.7
Prakasam	-5.9	-4.3	-8.8	0.1	2.2	-0.5	2.2	-3.6	-3.8	-4.8	-6.7	-3.5
Nalgonda	-9.6	-5.4	-9.6	-0.1	1.4	-1.1	8.1	-16.6	-8.3	-6.5	-2.2	-16.7
Visakhapatnam	-6.3	-4.3	-7.4	-5.2	0.4	-3.2	2.4	1.0	-5.9	-7.3	-5.2	-4.2
Kurnool	-4.4	-2.6	-3.8	-10.7	3.7	2.9	3.3	7.0	-0.9	0.3	-0.6	-4.4
Mahabubnagar	-6.3	-6.2	-3.4	-18.0	2.8	0.7	3.8	-2.6	-3.7	-5.5	0.3	-20.1
Guntur	-14.0	-25.0	4.7	176.6	5.0	2.7	5.9	-15.9	-13.9	-22.9	10.6	57.2
Kadapa	-7.8	-14.6	-6.2	-3.0	0.9	3.4	-2.0	-6.0	-7.0	-11.6	-8.1	-8.8

Table-13: Compound Annual Growth Rate (CAGR) of finger millet in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	-5.3	-4.9	-5.7	-7.5	0.9	0.5	-0.1	1.1	-4.5	-4.4	-5.8	-6.4
Visakhapatnam	0.0	0.0	-1.0	-2.6	1.1	-0.5	-0.2	1.1	1.2	-0.5	-1.1	-1.5
Chittoor	-6.0	-8.8	-5.0	-3.7	0.4	0.2	-2.4	4.0	-5.6	-8.7	-7.3	0.2
Vizianagaram	-3.9	-1.5	-4.9	-7.0	1.1	4.1	1.8	4.8	-2.8	2.5	-3.2	-2.5
Mahabubnagar	-7.6	-1.7	-9.9	-16.8	3.0	1.8	2.4	5.8	-4.9	0.1	-7.7	-12.0
Anantapur	-53.0	-8.9	-6.3	-20.6	1.6	2.0	1.0	-5.3	-5.8	-7.1	-5.3	-24.8

Pulses

Chickpea, blackgram, pigeonpea and greengram are the important pulse crops in the state. Kurnool, Prakasam and Anantapur are the major chickpea growing districts accounting for 70 per cent of production (Table-14). Prakasam district leads in productivity (1.5 t/ha). Yield declined in all the districts especially during 2001-05. Production growth was higher in Prakasam, Kurnool and Medak, mainly driven by area expansion.

The situation with respect to chickpea was not satisfactory during 2001-05. The yield growth in most of the districts was either non significant or negative. Only in a couple of districts, yield grew in the recent past. The expansion in area under chickpea was happening at the cost of rabi rice.

Table-14: Compound Annual Growth Rate (CAGR) of chickpea in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	9.0	0.4	10.1	15.6	5.1	3.2	-0.1	-4.0	14.5	3.6	10.0	11.0
Kurnool	13.5	10.4	4.0	14.0	4.2	5.9	-6.0	0.2	18.3	16.9	3.3	14.2
Prakasam	20.2	11.9	24.5	23.2	6.1	3.3	6.6	-8.4	27.5	15.6	32.7	12.8
Anantapur	15.1	12.8	14.2	5.0	1.4	0.0	0.2	-28.5	16.7	12.8	14.3	-25.0
Kadapa	15.5	4.1	13.2	3.0	7.9	15.0	3.2	-9.4	24.7	19.8	16.8	-6.7
Medak	3.9	-1.1	7.3	20.4	3.9	-1.8	-3.2	4.3	8.0	-2.9	3.9	25.6

Krishna and Guntur are the major producers of blackgram. Area under blackgram declined since 1990 (Table-15). It appears that chickpea, maize and sunflower are replacing this crop. Yield declined in both the districts with higher area and production. Area sown under pigeonpea in major districts either stagnated or was

declining (Table-16). There was no significant trend in productivity indicating wide fluctuations. Prakasam and Mahabubnagar, the two major districts, lost both on account of area and production. Medak, Nalgonda, East Godavari, Mahabubnagar and Khammam are leading producers of greengram. Higher growth in yield coupled with area expansion in Nalgonda during 2001-05 led to production growth (Table-17). At the state level, there was an increase in area after 2000. Productivity levels were fluctuating around 350 kg ha $^{-1}$ much below the potential.

Blackgram and green gram are traditionally grown in rice fallows in the rice growing districts. However, these pulses are not gaining in terms of area at the state level since 1990. Recently, the area under greengram is showing the signs of stagnation.

The failure of monsoons in recent years has badly affected the canal irrigation in districts like Nalgonda, Khammam and Guntur as a result of which the area under green gram increased at the cost of rice. The high prices prevailing for green gram is another reason for arresting a further declining trend. In both the cases, some districts are growing more and more of these pulses during 2001-05 (Krishna and Srikakulam in the case of blackgram and Nalgonda, Khammam and Guntur in the case of greengram). Increasing incidence of insect pests such as *Maruca* sp. is affecting the yields of black gram and green gram. However, the situation with respect to yield growth was not encouraging. Only in Mahabubnagar, the yield of greengram was found to be increasing at 26% more offsetting the area loss. The yield growth was found to be relatively higher in Nalgonda where the area growth was also higher.

Table-15: Compound Annual Growth Rate (CAGR) of blackgram in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	3.8	8.6	-1.9	-8.5	0.0	8.7	-1.0	-5.7	3.9	18.0	-2.9	-13.7
Krishna	4.3	4.3	-5.4	5.1	0.2	7.1	1.1	-11.7	2.4	16.4	-4.4	-7.2
Guntur	1.6	9.9	-4.0	-24.3	0.0	9.1	0.9	-11.3	1.6	19.9	-3.2	-32.9
East Godavari	8.7	10.3	-1.3	-8.1	-3.4	9.5	-9.5	-11.6	4.5	20.7	-9.6	-18.6
Srikakulam	4.9	5.4	-0.2	4.6	-0.3	0.9	-1.3	0.9	4.6	6.3	-1.5	5.6
Prakasam	9.8	15.9	4.6	-26.7	-1.2	8.5	-7.8	-4.5	8.4	25.7	-3.5	-30.0
Medak	6.3	0.0	8.5	-8.2	3.1	7.6	0.4	11.8	9.6	7.6	9.0	2.5
Nellore	17.0	-4.3	20.9	-26.4	-1.3	7.9	-0.8	-14.1	15.5	3.3	20.0	-36.8

Table-16: Compound Annual Growth Rate (CAGR) of pigeon pea in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
Andhra Pradesh	3.1	5.3	2.3	0.8	2.9	-1.0	3.1	0.6	6.1	4.3	5.4	1.5
Prakasam	7.7	9.6	7.6	-1.1	0.9	-4.2	-6.0	-5.0	8.7	5.0	1.2	-6.1
Mahbubnagar	2.3	3.8	1.5	-4.2	3.7	-2.9	7.9	0.1	6.1	0.8	9.5	-4.2
Adilabad	0.8	1.8	-3.0	0.3	2.9	-6.6	12.4	8.6	3.6	-4.9	8.6	8.9
Anantapur	2.9	9.3	-0.9	5.4	4.7	0.8	5.0	30.8	7.7	10.1	4.0	37.7
Guntur	5.1	2.1	11.8	-7.3	2.6	-5.0	2.8	15.2	7.9	-3.0	14.9	6.8
Rangareddy	2.5	5.5	3.0	1.1	2.7	6.1	0.5	10.8	5.2	11.9	3.3	12.0
Nalgonda	4.5	6.1	4.6	9.9	2.8	0.6	3.9	9.2	7.4	6.8	8.4	20.0
Kurnool	3.1	10.9	2.0	-1.1	2.9	-2.5	0.9	1.0	7.2	8.1	2.8	-0.2
Khammam	3.4	10.5	-1.2	4.5	2.0	2.6	0.1	1.9	5.5	13.5	1.2	6.7
Warangal	5.3	-0.9	13.7	-3.0	2.1	-6.6	-5.8	-2.6	7.5	-7.5	7.1	-5.5

Table-17: Compound Annual Growth Rate (CAGR) of greengram in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	-0.4	-1.3	-1.3	0.9	0.5	23.2	2.3	3.3	0.1	0.8	0.9	4.3
Medak	4.7	0.3	6.9	1.6	1.0	2.2	3.9	-12.5	5.8	2.6	11.1	-11.0
Nalgonda	-0.4	0.0	-0.4	10.3	3.7	7.7	-0.4	14.8	3.2	7.6	-0.8	26.5
East Godavari	11.7	11.3	5.1	1.7	-2.1	-2.7	0.5	8.0	9.4	8.4	3.6	9.8
Mahabubnagar	7.0	-2.5	6.1	-10.6	8.7	3.6	3.4	36.1	-1.4	1.0	9.7	18.1
Khammam	-2.9	1.2	9.4	8.2	2.2	9.6	3.5	-5.2	-0.7	10.9	-5.4	4.4
Guntur	1.8	-9.7	5.3	4.5	0.5	-1.3	5.6	-8.5	2.2	-10.9	11.1	-4.3
Prakasam	10.7	14.5	2.4	5.0	1.2	4.2	4.5	-8.9	12.0	19.5	7.0	-4.3
Krishna	-4.6	-8.3	-4.7	3.0	1.5	-1.9	2.7	12.9	-3.2	-10.0	1.5	16.3
Srikakulam	4.5	4.2	-0.9	6.4	-1.2	-4.2	-2.1	-5.6	3.2	-0.2	-3.0	0.5
Warangal	-6.1	-4.1	-8.0	-7.5	1.3	-3.3	4.5	13.4	-4.9	7.8	-3.8	5.0
Karimnagar	-6.3	-1.1	-8.4	-16.1	-0.4	11.3	-3.3	-10.7	-6.7	10.1	-11.4	-25.0

Oilseeds

Groundnut is a major crop in Rayalaseema region and Mahabubnagar district accounting for 85 per cent of the total area. Both the area and production tended to decline over the last 15 years though at a slower pace (Table-18) with stagnation of productivity around 700 kg ha^{-1}. The unfavorable terms of trade especially after the 1990s due to liberalization seem to have significantly affected the crop. Recurrent

monsoon failures and incidence of bud necrosis and stem necrosis badly affected groundnut yields in Anantapur and other districts. Technology Mission on Oilseeds triggered sunflower cultivation in Andhra Pradesh. The crop is confined to Kurnool, Kadapa, Anantapur and Mahabubnagar (Table-19). The area and production grew in the 1980s, and then started to decline during 1990s showing increasing trends during 2001-05 despite decreasing yields. Castor is largely grown in Mahabubnagar, Nalgonda, Prakasam and Rangareddy districts. The performance has not been that well during the last 15 years with both area and production declining (Table-20).

Table-18: Compound Annual Growth Rate (CAGR) of groundnut in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	0.7	5.5	-3.3	-1.5	-0.4	1.7	-2.3	-5.1	0.3	7.2	-5.6	-6.5
Anantapur	3.3	7.3	0.0	0.1	-1.3	3.3	-2.7	-10.2	2.0	10.9	-2.7	-10.1
Kurnool	1.0	4.6	-4.2	-4.6	0.9	2.3	-1.1	-1.4	1.9	7.0	-5.2	-5.9
Chittoor	-0.8	2.0	-1.8	-1.6	-0.1	1.2	-4.4	-7.4	-0.9	3.3	-6.1	-8.8
Kadapa	1.7	10.7	-6.0	3.6	-0.9	3.7	-2.9	-12.1	0.8	14.7	-8.8	-8.9
Mahabubnagar	-2.3	-0.6	-4.3	-10.6	1.4	-1.8	-2.6	1.5	-0.9	-2.4	-6.7	-9.2

Table-19: Compound Annual Growth Rate (CAGR) of sunflower in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	7.6	0.5	3.8	28.8	1.8	14.5	-3.3	-9.7	9.6	15.0	0.3	16.3
Kurnool	4.4	-2.6	-0.9	21.3	2.2	17.1	-2.3	-9.3	6.6	14.1	-3.1	10.0
Kadapa	31.4	118.1	17.4	23.2	-0.1	25.4	-3.2	-13.8	31.2	171.8	13.7	6.2
Anantapur	18.6	31.5	12.3	17.3	-1.5	14.1	-6.0	-10.3	16.9	50.2	5.5	5.2
Mahabubnagar	6.3	-1.9	3.4	28.3	1.8	2.4	-1.8	0.9	8.2	0.5	1.6	29.4

Table-20: Compound Annual Growth Rate (CAGR) of castor in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	-0.3	3.2	-4.7	-6.9	3.1	3.3	-2.3	7.7	2.7	6.6	-6.9	0.3
Mahabubnagar	3.3	3.7	0.1	-10.7	3.4	6.2	-3.0	1.8	6.8	10.2	-2.9	-8.9
Nalgonda	-3.1	4.0	-7.3	-2.8	2.6	2.0	-0.2	11.0	-0.6	6.1	-7.5	8.0
Prakasam	-1.5	6.9	-15.6	-11.9	1.3	5.8	1.2	-1.5	-0.1	13.2	-14.5	-13.1
Rangareddy	-3.1	1.8	-8.6	2.7	3.8	0.2	-7.7	17.1	0.6	2.0	-15.5	20.2

Commercial Crops

The growth in area under cotton in major growing districts like Adilabad, Guntur, and Warangal was slowing down (Table-21). Cotton yield increased in Adilabad and Nalgonda through out 1980-05. In rest of the districts, yield declined. The area under chillies seems to have stagnated except in Khammam, Guntur and Kurnool (Table-22). There was productivity gain in Guntur, Kurnool, and Mahabubnagar districts leading to production growth. The performance of sugarcane was much better during the 1990s as there was production growth driven by yield gains in most of the districts (Table-23).

Table-21: Compound Annual Growth Rate (CAGR) of cotton in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	4.3	4.3	6.3	0.0	1.2	-1.3	-2.5	5.7	5.5	3.0	3.8	5.7
Adilabad	1.2	1.5	-0.3	-0.9	7.2	3.9	5.5	19.3	8.3	5.4	5.3	18.4
Guntur	1.1	8.3	-0.6	8.4	-0.4	-5.5	-8.9	13.2	0.6	2.8	-9.5	21.6
Warangal	16.7	38.4	13.3	-2.2	2.6	18.3	3.9	-17.7	19.2	56.8	17.2	-19.9
Khammam	27.9	73.0	12.7	2.1	10.4	29.3	-2.4	1.0	38.3	102.2	10.3	3.0
Nalgonda	23.9	32.7	21.1	-4.3	6.6	14.3	1.1	13.7	30.5	47.0	22.2	9.5
Kurnool	-0.1	-8.7	5.9	-15.6	3.0	9.2	-1.7	-6.7	2.9	0.5	4.2	-22.3
Mahaboobnagar	11.8	17.2	14.0	-1.6	1.5	2.0	-5.9	1.6	13.4	19.1	8.1	0.0
Krishna	9.9	20.7	16.2	10.5	2.0	-2.5	-6.1	9.5	11.8	18.2	10.1	20.0

Table-22: Compound Annual Growth Rate (CAGR) of chillies in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	1.6	3.3	0.8	0.9	3.9	5.8	5.0	9.5	5.6	9.4	5.8	10.6
Guntur	6.3	6.6	8.7	4.6	2.4	10.1	0.3	13.4	8.8	17.4	9.0	18.6
Warangal	3.2	6.1	-0.5	-0.9	5.6	3.6	9.3	2.8	9.0	9.9	8.8	1.9
Khammam	1.3	6.5	-1.9	8.3	4.1	7.8	9.1	4.3	5.5	14.8	7.0	13.0
Prakasham	2.7	13.8	-2.8	-1.1	2.3	-2.0	3.6	-0.9	5.1	11.6	0.7	-2.0
Kurnool	2.3	-2.7	7.1	4.0	5.8	0.2	7.1	17.3	8.2	-2.5	14.7	22.0
Krishna	0.3	5.4	-1.8	3.3	3.3	11.3	12.0	2.5	3.6	17.2	10.0	5.9
Karimnagar	-1.3	0.7	-5.3	-1.1	4.7	-1.7	7.4	-8.3	3.4	-1.1	1.7	-9.3
Mahaboobnagar	2.5	-4.7	7.5	-4.4	5.3	9.6	5.4	19.7	7.9	4.4	13.4	14.4
Nalgonda	4.8	8.8	5.3	3.0	4.0	6.3	12.6	9.2	8.9	15.7	18.6	12.5

Table-23: Compound Annual Growth Rate (CAGR) of sugarcane in Andhra Pradesh

District	Area				Yield				Production			
	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05	1980-05	1981-90	1991-00	2001-05
AP	2.5	2.5	-1.1	4.8	0.1	-2.8	4.2	-8.8	2.5	-0.4	3.1	-4.4
Visakhapatnam	3.1	3.3	1.9	0.5	-0.1	-1.7	0.2	-5.6	2.9	1.5	2.2	-5.1
West Godavari	2.8	2.4	0.8	-2.2	0.3	-0.8	2.3	3.6	3.1	1.6	3.1	1.2
Chittoor	2.6	2.5	3.6	-14.7	0.7	0.6	4.1	-3.8	3.2	3.1	7.9	-17.9
Medak	2.9	5.0	-5.6	-10.0	0.7	-4.9	8.0	1.4	3.6	-0.2	2.0	-8.7
Krishna	1.7	1.2	0.6	14.3	1.0	0.0	3.1	-5.6	2.7	1.2	3.7	7.9
Nizamabad	-0.8	-1.8	-5.3	-7.5	1.0	-1.8	7.6	-3.2	0.2	-3.6	1.9	-10.5
East Godavari	0.6	-1.6	0.9	2.8	0.3	-1.6	1.5	-1.6	0.9	-3.2	2.4	2.1
Vizianagaram	4.1	5.7	0.9	12.6	0.6	0.7	3.4	-7.6	4.8	6.5	4.4	4.0
Srikakulam	0.9	2.0	-0.8	27.6	0.3	-0.4	1.6	-1.7	1.2	1.5	0.9	25.5

4.0. HORTICULTURE SECTOR

4.1 State level Analysis

Horticulture received a boost in Andhra Pradesh after the formation of a separate department during 1982. The area under horticulture crops at that point of time was a mere 3.7 lakh ha, which increased to almost 16.5 lakh ha by 2005-06, accounting for about 13 percent of the state's gross cropped area. The state leads in production of citrus, chillies, turmeric and oil palm. An estimated 4 percent of the GSDP is contributed by horticulture sector in the state. The demand for horticulture produce enhanced from Rs.5018 crores (1996) to 7373 crores by 2002 (Table-24). The consumption growth in the state was the highest at 19 per cent in respect of dry fruits followed by fresh fruits (12 %) and vegetables (11 %).

Table-24: Consumption of horticulture products in Andhra Pradesh (Rs. crores at 1993-94 prices)

Horticulture Product	1996	2002	CAGR
Vegetables	1552	2953	11
Fresh Fruits	395	779	12
Dry Fruits	90	254	19
Spices	985	1385	7
Total	5018	7373	-

Source: RaboIndia (2005)

The total area under different horticulture crops grew from 1.75 million ha (triennium ending 2000-01) to 1.87 million ha (TE 2005-06). Nuts and Palms which had the largest area share in the horticulture sector in the TE2001, paved way to the fruits by 2005-06. The area under fruits grew faster with their share increasing from about 27.5 to 37.1 per cent (Table-25). Whereas, the area under nuts and palms put together and spices, came down, both in absolute and percentage terms.

Table-25: Area under different horticulture crops (1998 to 2006)

Sub-sector	TE 2000-01 (ha)	% share	TE 2005-06 (t)	% share
Fruits	483645	27.5	696871	37.1
Vegetables	241782	13.7	257967	13.7
Spices	389558	22.2	324753	17.3
Nuts and palms	631340	35.9	582720	31.0
Flowers	12128	0.7	14773	0.8
Total	1758453	100.0	1877084	100.0

4.2. District-level Analysis

Fruit Crops

The pattern of fruit crop area over the period 1998 to 2006 is depicted in Fig.1. It may be noted that there is tremendous increase in the area under fruit crops from about 4.8 (1998-99) to almost 7 lakh ha (2005-06). Among the fruit crops, orange showed a significant area jump by three times during this period. The general increase in area under fruit crops is due to the difficulties in rainfed farming like drought and scarcity of labour among others. This may be seen in districts like Mahabubnagar, Nalgonda and Anantapur, where the growth rate of area expansion was very high (Table- 26). Due to overall area and productivity increase, the production from the fruit crops in the state increased at 9.6 per cent. At the district level, despite stagnant productivity, increase in area contributed to significant growth in production of fruit crops in Nalgonda, Mahabubnagar and Anantapur districts. It may be noted that these districts are among the most drought-prone ones in the State where agriculture in general is highly risk-prone. The increase in area under horticulture crops in these districts may be attributed to the State's policy of promoting horticulture as a measure of risk minimization in such districts under schemes like NHM and APMIP.

Fig1.: Fruit Crops Area in AP: 1998 to 2006 (ha)

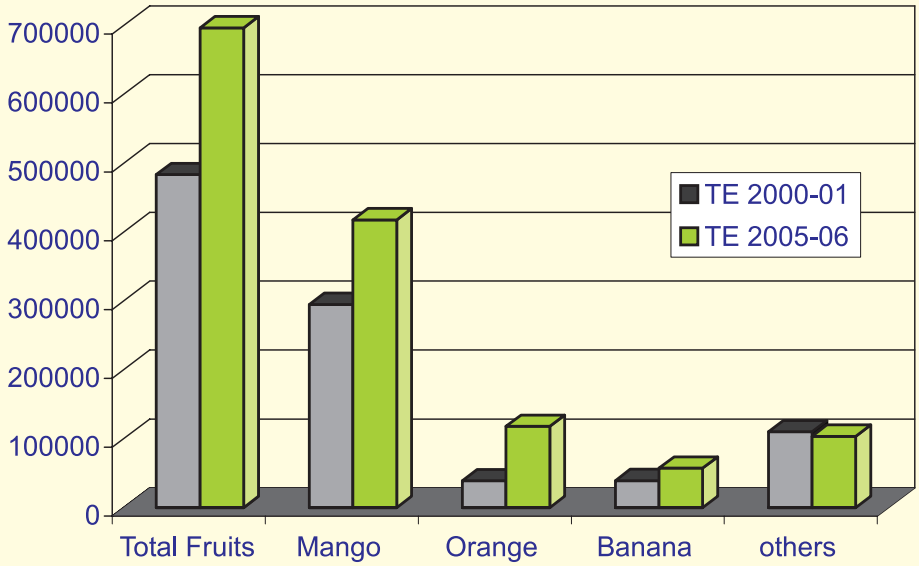


Table-26: Growth rates of area, production and productivity of fruit crops in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P	696871	100.0	6.7	8003992	100.0	9.6	2.9
Nalgonda	71428	10.2	29.4	819965	10.2	28.2	-1.2
Krishna	70415	10.1	1.2	614570	7.7	-1.6	-2.9
Chittoor	55053	7.9	6.3	432932	5.4	12.5	6.2
Anantapur	47685	6.8	17.1	845190	10.6	16.5	-0.6
Khammam	47557	6.8	4.4	438631	5.5	11.9	7.5
Nellore	44029	6.3	6.2	547931	6.8	8.9	2.6
Vizianagaram	43911	6.3	3.6	463241	5.8	13.5	9.9
Kadapa	36133	5.2	1.5	563183	7.0	0.0	-1.5
West Godavari	36070	5.2	-5.2	479845	6.0	-1.1	4.1
East Godavari	34072	4.9	-4.7	480324	6.0	14.7	19.4
Prakasam	31741	4.6	15.8	424841	5.3	19.0	3.2
Adilabad	29450	4.2	46.8	147318	3.3	26.7	-20.1

Mango

Among the fruit crops, ten districts of the state occupied over 80 per cent of the state's area under the crop (Table-27). Highest area growth was observed in Adilabad (47.9 %) followed by Mahabubnagar (29.2 %) and Warangal (28.4 %). The productivity growth was negative in Adilabad, West Godavari, Krishna and Mahabubnagar. In the case of Adilabad and Mahabubnagar, the negative growth rate in productivity is mainly due to the fact that large proportion of the orchards were too young and were yet to come to bearing.

Table-27: Growth rates of area, production and productivity of mango in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P	417921	100.0	7.0	3219477	100.0	6.2	-0.9
Krishna	65731	15.7	0.9	525848	16.3	-3.1	-4.0
Chittoor	53596	12.8	6.5	401459	12.5	13.0	6.5
Adilabad	27854	6.7	47.9	126256	3.9	34.4	-13.6
Khammam	41651	10.0	5.2	333211	10.3	10.0	4.8
Vizianagaram	36557	8.7	4.5	292459	9.1	12.1	7.6
Warangal	18402	4.4	28.4	147219	4.6	37.0	8.6
Vishakhapatnam	18578	4.4	2.8	148627	4.6	9.7	7.0
East Godavari	19342	4.6	-0.9	154739	4.8	8.8	9.7
Mahabubnagar	14568	3.5	29.2	116541	3.6	25.9	-3.3
Kadapa	19456	4.7	3.7	155651	4.8	4.3	0.6
West Godavari	20369	4.9	-2.1	162949	5.1	-9.1	-6.9

Orange

Area under orange in the state recorded a very high growth (22.8 %) resulting in a significant production growth (18.5 %) despite negative growth in the productivity (Table- 28). This was possible mainly due to large area expansion in non-traditional areas like Nalgonda and Mahabubnagar. In the traditional orange district like Anantapur, the area growth was nullified by loss in productivity.

Table-28: Growth rates of area, production and productivity of orange in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P	118049	100	22.8	1445925	100.0	18.5	-4.3
Nalgonda	47728	40.4	39.0	577339	39.9	34.5	-4.5
Anatapuram	21967	18.6	9.8	236474	16.4	0.4	-9.4
Prakasam	17374	14.7	22.8	227169	15.7	25.5	2.7
Mahabubnagar	7902	6.7	43.2	103486	7.2	36.8	-6.5
Nellore	4770	4.0	40.8	62340	4.3	15.7	-25.1

Banana

Banana is the next important fruit crop in Andhra Pradesh after mango and orange in terms of area. Higher growth in area was recorded in Kurnool, Khammam, Krishna and West Godavari districts (Table-29). The productivity growth was negative and was significant in most of the banana growing districts. However, except in Kadapa and Guntur districts, the production growth was high mainly due to area growth, despite declining productivity.

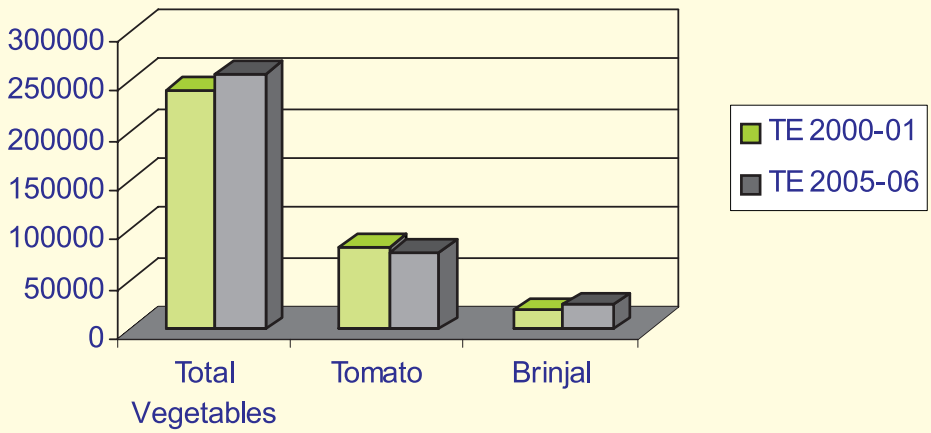
Table-29: Growth rates of area, production and productivity of banana in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P	57241	100	7.2	1359907	100.0	3.6	-3.7
East Godavari	12186	21.3	4.0	290566	21.4	26.7	22.7
West Godavari	10112	17.7	12.0	241122	17.7	7.1	-5.0
Vizianagaram	6589	11.5	9.7	155947	11.5	16.7	7.0
Kurnool	4386	7.7	23.2	104047	7.7	17.8	-5.4
Guntur	5854	10.2	-3.8	137716	10.1	-4.3	-0.6
Kadapa	3731	6.5	-1.0	88284	6.5	-12.2	-11.2
Krishna	2259	3.9	15.9	54142	4.0	14.1	-1.8
Khammam	2256	3.9	22.0	53890	4.0	17.7	-4.3

Vegetables

The area under vegetable crops in the state increased from 241782 to 257967 ha during the period from 1998-99 to 2005-06 (Fig.2). Among the vegetables tomato, which was the major crop, lost considerable area (from 84031 to 76954 ha) during this period, while another major vegetable brinjal, gained in terms of area.

Fig.2: Vegetable crops area in AP: 1998-99 to 2005-06 (ha)



Vegetable production in the state increased at an annual rate of 3.6 per cent on account of both area and productivity gains during the study period (1998-99 to 2005-06). Five districts viz. Kurnool, Adilabad, East Godavari, Chittoor and Ranga Reddy contributed to almost 50 per cent of the state's vegetable area and production (Table-30). In most of these districts, the proximity to the metropolitan cities like Hyderabad, Bangalore, Chennai and Visakhapatnam may have been the factor that ensured ready market for the produce. The area and production growth rates were the highest in Adilabad. In districts like Ranga Reddy and Guntur the area growth rate was negative. The growth rates of yield were significantly higher in districts like East Godavari, Ranga Reddy, Visakhapatnam, Mahabubnagar and Chittoor. This might be due to adoption of high yielding technologies in the form of varieties and fertilizers. In the case of Kurnool district, which happens to be the largest vegetable producer in the state, the production growth was negative largely due to loss of area and almost stagnant productivity.

Table-30: Growth rates of area, production and productivity of vegetables in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P	257967	100.0	1.4	3794880	100.0	3.6	2.3
Kurnool	39013	15.1	-5.4	599757	15.8	-5.2	0.2
Adilabad	27345	10.6	44.8	428508	11.3	43.7	-1.2
East Godavari	26322	10.2	-1.5	473134	12.5	9.7	11.2
Chittoor	20188	7.8	7.8	322405	8.5	16.0	8.3
RangaReddy	19506	7.6	-4.9	280407	7.4	6.1	11.0
Vishakhapatnam	15096	5.9	3.3	198497	5.2	13.1	9.9
Mahabubnagar	14899	5.8	4.6	197061	5.2	12.9	8.3
Medak	14511	5.6	6.8	203314	5.4	11.3	4.5
Guntur	11534	4.5	-3.3	145703	3.8	-1.5	1.8
Kadapa	8346	3.2	0.1	135700	3.6	5.3	5.2
Nizamabad	7883	3.1	-1.9	102365	2.7	5.8	7.7

Tomato

Very high growth both in terms of area and production (43 and 45 %) was recorded in Adilabad district during the period under study (Table-31). Kurnool district seems to be losing the leadership due to both area and productivity loss. Chittoor district gained prominence due to significant growth in both area and yield. In districts like Mahabubnagar and Ranga Reddy although there was loss of area, growth in production was noted on account of higher growth in productivity.

Table-31: Growth rates of area, production and productivity of tomato in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P	76954	100.0	-1.7	1259126	100.0	1.6	3.2
Kurnool	17125	22.3	-10.2	270651	21.5	-12.0	-1.8
Chittoor	14187	18.4	9.2	233673	18.6	20.1	10.9
Adilabad	10405	13.5	43.1	191892	15.2	44.8	1.7
RangaReddy	7336	9.5	-12.6	110074	8.7	3.7	16.3
Mahabubnagar	3936	5.1	-6.4	62187	4.9	11.1	17.5
Kadapa	3757	4.9	9.3	63849	5.1	13.5	4.1
Anatapuram	3601	4.7	2.9	58585	4.7	9.2	6.3
Medak	3426	4.5	6.5	58074	4.6	15.3	8.8

Brinjal

The area and productivity of brinjal in the state increased moderately and accounted for a production growth of over 10 per cent (Table-32). Among the districts, highest growth rate was recorded in Adilabad in both area and productivity resulting in high production growth. In Kurnool, brinjal was observed to be replacing tomato as may be seen from faster production growth (29.7 per cent). Higher production growth rates were recorded in Nizamabad, Medak and Chittoor districts. However, it needs to be watched over time as to whether the rate of growth is sustainable, as brinjal is one of the high pesticide-consuming vegetable crops.

Table-32: Growth rates of area, production and productivity of brinjal in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P	24421	100.0	7.4	498172	100.0	10.7	3.4
Adilabad	3748	15.3	44.4	76486	15.4	51.7	7.3
East Godavari	2488	10.2	2.6	50695	10.2	2.5	-0.1
Vishakhapatnam	2485	10.2	9.7	50840	10.2	16.7	7.0
Kurnool	2008	8.2	21.4	41595	8.3	29.7	8.2
RangaReddy	1805	7.4	3.5	36560	7.3	8.7	5.2
Chittoor	1801	7.4	8.1	36684	7.4	15.4	7.3
Vizianagaram	1125	4.6	4.9	22863	4.6	6.7	1.8
Krishna	926	3.8	0.9	18807	3.8	2.6	1.7
Srikakulam	922	3.8	-1.2	18743	3.8	0.5	1.7
Nizamabad	887	3.6	18.1	17885	3.6	24.0	5.9
Medak	886	3.6	20.1	18055	3.6	26.1	6.1
West Godavari	875	3.6	-3.0	17869	3.6	-1.4	1.7

Spices

The area under spice crops is coming down in Andhra Pradesh mainly due to reduction in area under chillies (Fig.3). In fact, the area reduction in spice crops was at the rate of 8000 ha per annum. One of the reasons was absence of incentives to cultivation of spices. The area under turmeric, the next important spice crop was more or less stable over the period. The growth rates of area and production of spices in almost all the districts were negative (Table-33), whereas in respect of productivity the growth rate was positive and moderate in districts like Medak, Kurnool and Kadapa.

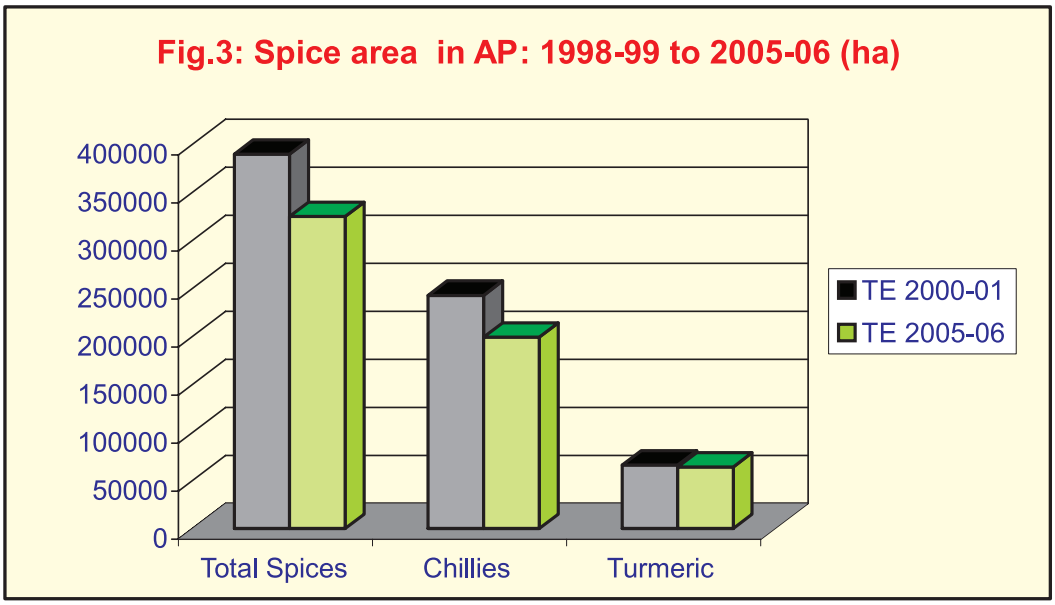


Table-33: Growth rates of area, production and productivity of spices in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P	324753	100.0	-4.2	861690	100.0	-4.0	0.2
Guntur	58128	17.9	0.5	136120	15.8	-3.0	-3.5
Warangal	27633	8.5	-10.9	71655	8.3	-8.8	2.1
Kurnool	26756	8.2	-7.7	43703	5.1	-4.3	3.4
Khammam	24054	7.4	0.3	46845	5.4	-4.8	-5.1
KarimNagar	23345	7.2	-2.8	88975	10.3	-1.9	0.9
Kadapa	21835	6.7	-4.7	53016	6.2	-2.1	2.7
Adilabad	20550	6.3	2.7	68186	7.9	0.7	-2.0
Medak	13709	4.2	-6.0	29616	3.4	-1.7	4.3
Krishna	12675	3.9	-3.8	36137	4.2	-4.4	-0.6
Nizamabad	12139	3.7	-2.3	50074	5.8	-6.7	-4.4

Turmeric

India accounts for 80 per cent of the global turmeric production and Andhra Pradesh's share in India is about 58 per cent. Six districts led by Karimnagar cultivate about 83 per cent of the state's turmeric area (Table-35). The area

growth was positive in Karimnagar, Adilabad and Guntur districts during the period 1998 to 2006, while in the other districts the area was declining. The productivity growth of turmeric was positive only in Warangal district while in all other districts, it was negative. Thus, except in Adilabad, in all other districts, the production growth rate was either stagnant or declining. Increased cost of cultivation coupled with fall in prices (from Rs.2200 in 2003 to Rs.1950 per q in 2006) is hampering turmeric growth. Another aspect concerning the turmeric in the state is the lower curcumin levels of about 2.7 compared to 3 to 6 per cent in the turmeric in other growing states like Kerala and Tamil Nadu.

Table-35: Growth rates of area, production and productivity of turmeric in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P	63933	100.0	0.8	306096	100.0	-1.2	-1.9
KarimNagar	16050	25.1	5.7	77152	25.2	0.7	-5.1
Adilabad	9284	14.5	6.0	47958	15.7	4.0	-1.9
Nizamabad	9254	14.5	-1.1	44028	14.4	-5.2	-4.1
Warangal	8990	14.1	-3.5	40873	13.4	-0.6	3.0
RangaReddy	4996	7.8	-4.2	23533	7.7	-6.1	-1.9
Guntur	4448	7.0	1.5	20719	6.8	-0.9	-2.4

Flowers

Traditionally flowers like jasmine, marigold, and chrysanthemum and of late, cut flowers like rose are commonly cultivated in Andhra Pradesh. The area under flowers increased from 12128 to 14773 ha during the period 1998 to 2006. The area under flower crops thus grew at about 12 per cent annually in the State (Table-36). Very high growth rate in area was observed in districts like Guntur, Chittoor and Anantapur. Significant productivity growth was however observed only in case of Chittoor, East Godavari, Visakhapatnam and Kadapa districts.

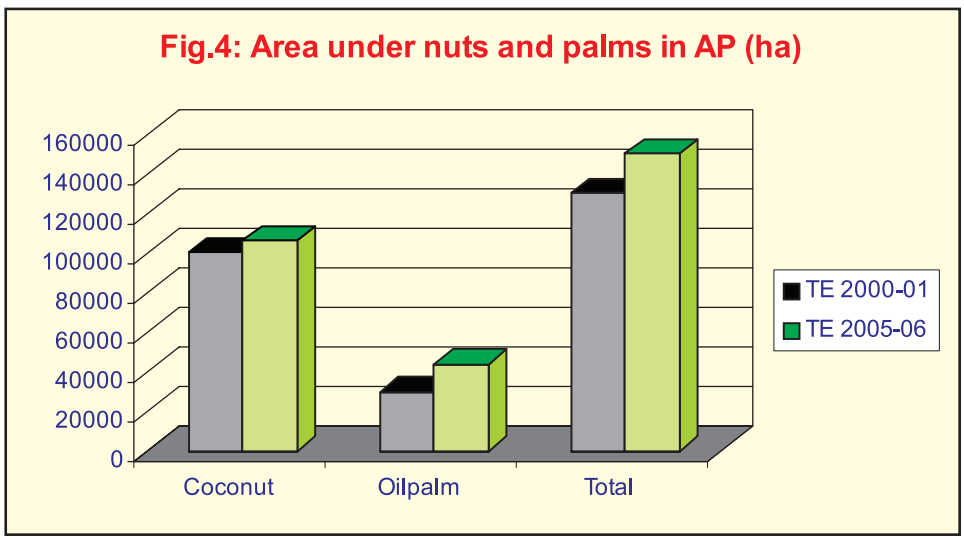
Table-36: Growth rates of area, production and productivity of flowers in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P.	14773	100.0	12.0	65270	100.0	-8.1	-20.1
RangaReddy	2182	14.8	-5.5	11211	17.2	-5.0	0.5
Anatapuram	1220	8.3	27.9	6599	10.1	3.7	-24.2
Vishakhapatnam	1169	7.9	2.6	3898	6.0	7.0	4.4
Kadapa	783	5.3	0.4	5007	7.7	4.6	4.2

Nuts and Palms

Coconut and oil palm area in the state rose from 130858 (1998-99) to 150329 ha (2005-06), with large increase in oil palm area during this period (Fig.4).

Fig.4: Area under nuts and palms in AP (ha)



Coconut

The area and yield of coconuts was almost stagnant in the state, resulting in a marginal increase in the growth rate of production (Table-37). The moderate growth in productivity led to production growth of coconuts in both the Godavari districts. In the rest of the districts, the production was stagnant.

Table-37: Growth rates of area, production and productivity of coconut in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P Total	106297	100.0	1.2	1161	100.0	2.3	1.1
East Godavari	49311	46.4	0.5	611	52.6	4.0	3.5
West Godavari	22511	21.2	1.5	239	20.6	5.7	4.2
Srikakulam	13715	12.9	0.3	127	10.9	1.5	1.2
Vishakhapatnam	8323	7.8	3.8	61	5.3	0.5	-3.2
Chittoor	4492	4.2	5.7	36	3.1	0.6	-5.1

Oil Palm

At the state level, oil palm area increased at a CAGR of 8 per cent with a productivity growth rate of 4.8 per cent. Very high production growth rates were noticed in Khammam and Nellore districts mainly due to productivity gains (Table-38).

Table-38: Growth rates of area, production and productivity of oil palm in Andhra Pradesh (1998-99 to 2005-06)

District	Area			Production			Productivity
	Area TE2005-06 (ha)	% Share	CAGR (%)	Production TE2005-06 (t)	% Share	CAGR (%)	CAGR (%)
A.P Total	44032	100.0	8.0	161772	100.0	12.8	4.8
West Godavari	17140	38.7	12.3	63169	39.0	9.2	-3.0
East Godavari	10602	23.9	5.2	38821	24.0	13.9	8.7
Krishna	4024	9.1	9.0	14732	9.1	6.8	-2.1
Khammam	2780	6.3	9.8	10223	6.3	43.1	33.3
Nellore	3263	7.4	-0.2	11877	7.3	27.8	28.0

5.0. INFRASTRUCTURE FOR AGRICULTURE

The level of agricultural infrastructure like irrigation, credit supply, fertilizer availability, market network etc. determines the growth of agriculture in a region. Therefore, the nature and extent availability of such infrastructure for the agriculture sector in Andhra Pradesh was analyzed.

Farm Credit

The credit supply for agriculture increased from Rs.2956 to 14113/ha (at current prices) during the period 1995 to 2005 at a growth rate of 38 per cent (Table-39). The absorption of credit in the resource poor district like Adilabad enhanced at a greater pace (45 %). In districts viz. Srikakulam, Visakhapatnam, Guntur and Rangareddy, the growth rate of credit flow was above 50 per cent. On a per ha basis, the highest credit flow was above Rs.20000 (in 2005) in West Godavari, Guntur and Nellore districts mainly on account of credit to aquaculture sector.

Table-39: Agricultural advances by Scheduled Commercial Banks to agriculture (Rs./ha of net sown area)

District	1995	2005	Annual growth rate (%)
Andhra Pradesh	2956	14113	38
Adilabad	733	4064	45
Anantapur	1634	7486	36
Chittoor	3481	17362	40
Kadapa	3090	12211	30
East Godavari	4746	19597	31
Guntur	3249	20444	53
Karimnagar	2724	12468	36
Khammam	1215	6432	43
Krishna	4693	17399	27
Kurnool	1447	7891	45
Mahbubnagar	1943	7007	26
Medak	3338	9396	18
Nalgonda	2011	8016	30
Nellore	5306	21830	31
Nizamabad	4087	19673	38
Prakasam	3387	13577	30
Rangareddy	3034	18785	52
Srikakulam	1535	10151	56
Visakhapatnam	2201	14098	54
Vizianagaram	1330	6296	37
Warangal	2950	12269	32
West Godavari	6030	25015	31
Mean	2917	13248	35
Lowest : Highest ratio	**8**	**6**	

Irrigation

One of the reasons for declining growth in agriculture is the declining irrigated area (Table 40). The net irrigated area in the state declined at a rate of 4.02 per cent during the period 1999-05. The rate of decline was sharper in case of area irrigated by tanks and open wells. Growth was observed only in case of tube well irrigation signifying the private investment rather than public investment. Favourable water and power pricing and credit policies were behind the faster growth in tube well irrigation and eventually led to over exploitation of ground water resources. There is a need to have a closer look at the canal irrigation systems for better management and tank systems which are traditionally community managed. The situation was no different in the districts also. All the districts witnessed a falling irrigated area with the rates of decline significant in Anantapur, Chittoor, Nizamabad, Medak, Mahabubnagar, Karimnagar and Rangareddy districts.

Table 40: Compound annual growth rate in net area irrigated by different sources, 1999-05

Source	CAGR(%)
Canals	-6.48
Tanks	-8.33
Tube wells	4.39
Other well	-7.23
Total wells	-0.50
Other sources	-7.23
Total	-4.02

Market Network

Infrastructure for agriculture like marketing encourages agricultural growth. One of the indicators of marketing support is the concentration of agricultural market committees in a district. Hence, considering the state average concentration of 3.8 markets per one lakh ha of net sown area, the districts were classified in to those with four or more markets per one lakh ha and those with less than four markets. Only eight district had lower market concentration (<4) in the state.

Table-41: Regulated markets for agriculture produce in Andhra Pradesh

Higher Market infrastructure (4 or more APMC/ 1 lakh ha NSA)	Lower Market infrastructure (<4 or more APMC/ 1 lakh ha NSA)
Visakhapatnam,Chittoor, Karimnagar, Nizamabad, Nalgonda, East Godavari, Krishna, West Godavari, Srikakulam, Kadapa, Nellore, Vizianagaram, Guntur	Khammam, Prakasam, Warangal, Adilabad, Medak, Mahbubnagar, Kurnool, Anantapur

Apart from the infrastructure, the behaviuor of monsoon in terms of arrival, distribution and withdrawal would greatly influence agriculture directly and indirectly through affecting the irrigation sources. The state suffered subnormal monsoons and incidence of drought frequently during the last 15 years (Annexure). In the past 15 years since 1991, Karimnagar district experienced maximum number of drought years (9) followed by Medak and Mahbubnagar.

6.0. SUMMARY AND POLICY IMPLICATIONS

As is evident from the findings presented, the crisis in Andhra Pradesh agriculture is wide spread across crops and districts. The situation is alarming especially with respect to food grains. The average annual index of total factor productivity during 1995-2000 period was five per cent less than that during the 1980s in the state. Similarly, there was absolute decline in the contribution of technologies in the non-food crops during the post reform period (Rao, 2005). Significant area gains were observed in crops like sunflower, maize and chickpea, while productivity gains were limited to castor and chillies. Overall production growth was seen in maize, cotton and chillies. At the disaggregate level, maize performed better in Karimnagar; chickpea in Prakasam and Kurnool; and sunflower in Kurnool and Kadapa districts.

Rice is the leading food crop of the state. However, the area under rice in Andhra Pradesh is being gradually replaced by less water intensive crops such as chickpea, maize and sunflower as reflected in the acreage under these crops, probably due to shrinking water resources. Though such a shift is desirable as far as the conservation of groundwater is concerned, the large-scale transfer of area from rice deserves more critical analysis with respect to implications to food security. System of Rice Intensification (SRI), which is picking up of late in response to the precarious water resource situation can be one of the alternatives to retain the primacy of the crop in the state.

Pulse crops in the state are predominantly rainfed. Besides recurrent mid-season droughts, one of the other reasons for falling productivity levels of pulses is the non-availability of quality seeds. Further, in pulses like chickpea, farmers in this state do not prefer to cultivate *Kabuli* type varieties that have high yield potential. Another important issue that affects profitability of chickpea is that the consumption demand within the state is relatively low compared to pigeon pea. Therefore, appropriate and proactive marketing facilities should be developed lest the prices fall in the season of abundance. These two pulse crops play an important role in building up soil fertility as well as a source of protein in human diet. It is therefore necessary to take up appropriate measures in terms of research, extension and price support for increasing the area under pulses. It is to be noted here that the per capita availability of pulses did not improve significantly over time in India.

A stagnant productivity level in pulses is an area of national concern. It is well known that the yield barriers in pulses are difficult to break when compared to cereals. However, it is amply demonstrated that one critical irrigation besides following measures like IPM and INM could substantially boost yields (AICRPDA, 2005). Public investment and institutional arrangements to create infrastructure to enable these measures could help increase pulse outputs and bring down imports.

Among the oilseeds, performance of groundnuts was not encouraging while sunflower was gaining ground mainly due to yield gains coupled with profitability. Castor can gain prominence in the state if promoted with better industry linkages.

The poor performance of agriculture can be attributed primarily to three sets of reasons – technological, environmental and policy related. Compared to 1980s and early 1990s, the technological advances in agricultural production seem to have slowed down as evident from the slow down of total factor productivity growth. In most of the crops, there was no significant growth in terms of higher yield. Similarly, frequent droughts affected not only dryland crops but also irrigated crops. The problem gets aggravated when groundwater is overexploited making it unsustainable in the long run. The liberal credit and power supply policies have been at least partly responsible for groundwater over exploitation. It was also observed that the response of yield of crops such as rice to chemical fertilizers declined due to lack of new varieties with higher yield potential and buildup of salinity because of inefficient irrigation methods. Decreasing application of organic manures has also had its negative effects. The most important policy related factor is the decline in public investment in agriculture, especially in irrigation. However, the recent efforts by the state in enhancing irrigation capability would have significant impact on agricultural growth in the years to come. Increased public investment in many less-favoured areas is likely to generate greater agricultural growth at the margin than comparable investments in many high-potential areas. As investments in irrigated areas continue to increase, their marginal returns come down gradually, whereas in the rainfed areas, the marginal returns from additional government investments in technology and infrastructure are larger (Fan et. al, 2000).

Opening up of agricultural sector to global trade has also affected the profitability of crops. Import of edible oils has made the domestic production inefficient. Therefore, public investment must be enhanced for infrastructure building in the rainfed districts to invigorate the growth of agriculture. Non-price factors seem to be more important determinants in aggregate agricultural supply than the price related factors in Andhra Pradesh (Rao, 2004). Therefore, the government has to enhance public investment in agriculture in different ways, more specifically in rainfed areas, in order to secure the livelihoods of millions of farmers.

Diversification is the mantra for risk-aversion in agriculture. Farmers are increasingly realizing that cultivation of only food grains is not a profitable option. Besides, the State is promoting horticulture as means to avert risk and increase profitability by providing the farm household the much-needed stability. The promotion of horticulture with schemes like NHM and Andhra Pradesh Micro Irrigation Project (APMIP) has really benefited the sector. With rising incomes the demand for horticultural produce is increasing steadily. This has resulted in availability of assured markets for certain fruits, vegetables and flowers.

The analysis of the time series data indicates that it was an area led growth in the case of fruits whereas in vegetables it was primarily a productivity led growth. There was a declining trend in spices. The growth in coconut was marginal and in oil palm it was a good performance, since it was a new crop. In respect of flowers too at the state level, there was a decline in growth, with exceptional increase in

two districts. The horticulture scenario of AP offers opportunities to address the challenges by re-prioritizing the goals and limitations by considering micro level situations at the district level.

In order to gain from the growth and to sustain the same, more public investment is needed for developing the markets, storage and processing facilities. There is also a need to link the farmers with the national and international markets. This could be done by providing the market intelligence and with better extension. Putting supportive institutional arrangements in place is a prerequisite to be able to realize the benefits of getting integrated with the global and far-off markets within the country.

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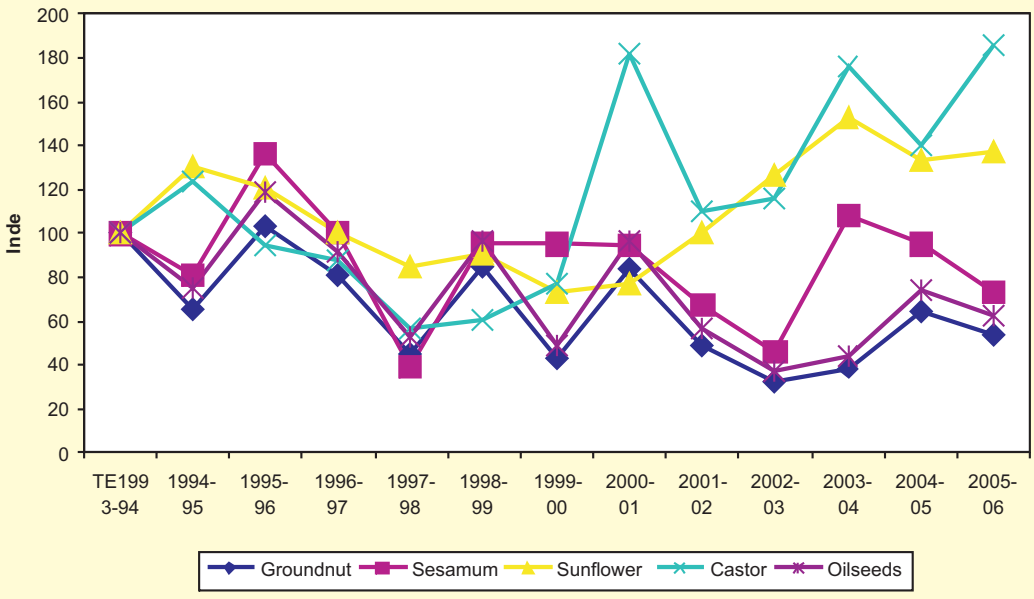
Annexure

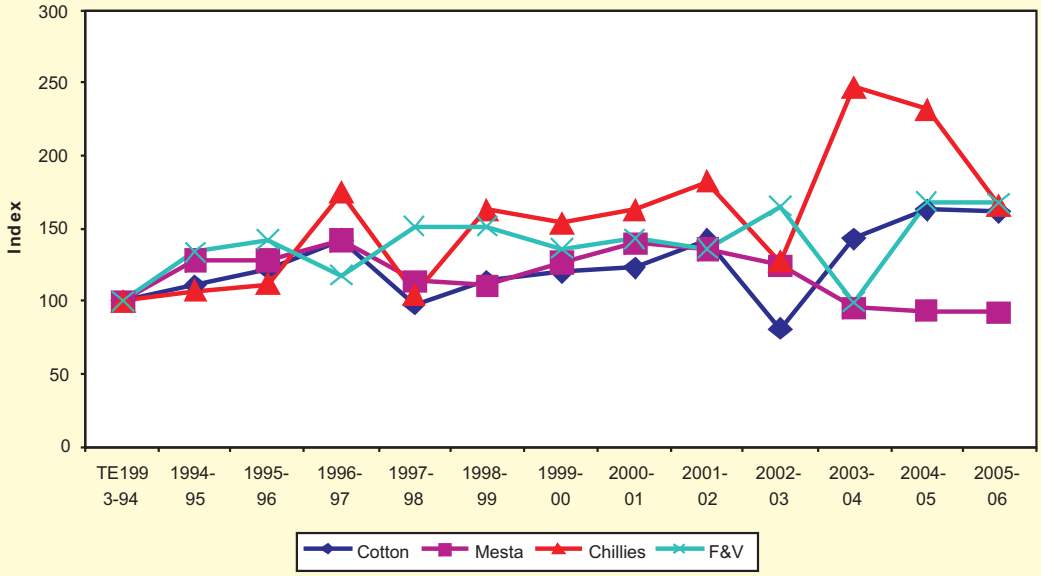
District wise normal rainfall and number of drought years

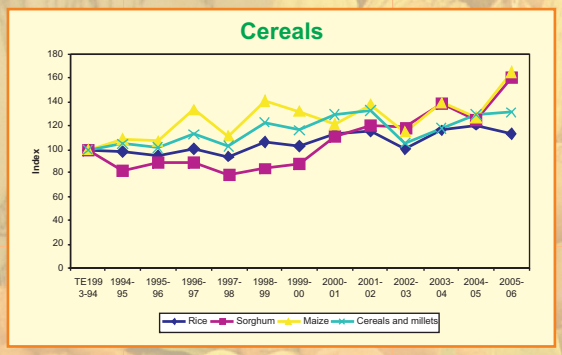
District	Normal Rainfall (mm)	No. of drought years 1991-2000	2000-05
Andhra Pradesh	940		2
Adilabad	1104	2	2
Anantapur	536	1	1
Chittoor	841		1
Kadapa	719	1	2
East Godavari	1124		2
Guntur	904	1	2
Karimnagar	978	5	4
Khammam	1096		1
Krishna	1020	2	2
Kurnool	655	1	1
Mahbubnagar	749	4	2
Medak	955	4	3
Nalgonda	744	3	2
Nellore	999	1	1
Nizamabad	1069	3	2
Prakasam	812	1	2
Rangareddy	835	2	2
Srikakulam	1157	1	2
Visakhapatnam	1111	2	1
Vizianagaram	1156	1	4
Warangal	991	2	2
West Godavari	1102	2	3

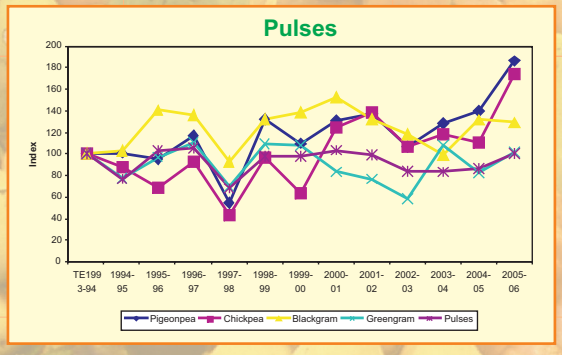
Trends in production of oilseeds in AP, 1993-94 - 2005-06

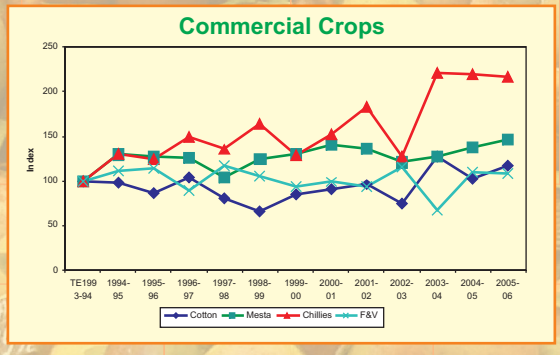


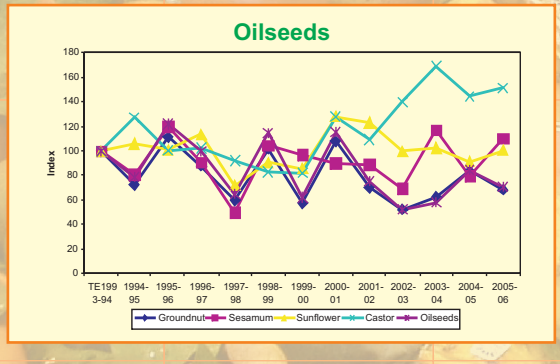
Trends in production of commercial crops in AP, 1993-94 - 2005-06











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